273* Does insulin treatment influence growth and lung function in children with abnormal oral glucose tolerance test (OGTT) but normal fasting glucose?

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Aims: To study the influence of insulin treatment on growth and lung function in children with CF who had an abnormal OGTT but normal fasting glucose.
Methods: The study included CF patients who had an abnormal OGTT (2 h glucose >7.8 mmol/l) but normal fasting glucose: 14 given insulin glargine (Gp A) owing to clinical deterioration and 13 not given insulin (Gp B). They were compared to 55 CF patients with normal OGTT (NGT). Height (Ht), weight (Wt) and BMI (expressed as SDS), and best FEV_1% at diagnosis and treatment (t0), and changes in the 12 mo before (Δpre) and 12 mo after (Δpost) were compared. Median values shown and nonparametric analysis taking account of repeated measures used.
Results: Gp A differed from B in the following: higher 2 h plasma glucose (11.9 vs 9.5 mmol/l, $P=0.01$) and significant decline in Wt in preceding 12 mo ($P=0.02$). Gp A had lowest Wt t0 and BMI t0 (−0.6 SDS; B: 0.1 SDS; NGT: −0.3 SDS). Compared to NGT, gp A and B had lower Ht t0 ($P=0.03$), FEV_1 t0 ($P<0.001$) and FEV_1 Δpre (A: $P=0.03$, B: $P=0.01$) but not FEV_1 Δpost. FEV_1 declined significantly (>5%) before t0 in 8/14 gp A patients and improved in 6 of these. It declined in 7/13 gp B patients and improved in 5 of these.

	FEV_1%			Ht SDS			Wt SDS		
Gp	Δpre	t0	Δpost	Δpre	t0	Δpost	Δpre	t0	Δpost
A	−14	61	−1	0	−1.0	−0.1	−0.3	−1.2	−0.2
B	−10	58	2	−0.1	−1.3	0.1	0.1	−0.8	−0.1
NGT	−5	86	−5	−0.1	−0.6	0	−0.1	−0.5	−0.1

Conclusion: Over 12 mo, the progressive decline in lung function was halted in patients with more severe undernutrition and hyperglycaemia on an OGTT who were treated with glargine as well as in patients with less severe hyperglycaemia and undernutrition not given insulin. Other potential benefits from the anabolic effects of insulin need to be explored.

274* Long term complication screening in Cystic Fibrosis related diabetes

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Introduction: The UK NSF for Diabetes (2002) recommends that all diabetics should undergo an annual screen for long term complications, including microangiopathy and cardiovascular risk factors. With increasing CF survival, such screening may now be relevant for those with CFRD and we have incorporated this into their annual adult CF screening programme. We report our experience.
Method: At the annual screen, weight, HbA1C, BP, fasting cholesterol, injection sites, pedal vibration and tactile senses, and urine for microalbuminuria are checked. We also check glucose monitors, equipment, needle size, insulin regimes and update patient education.
Results: Of our 50 patients with CFRD (25% of the total clinic population), 14 male [mean age 27 years (range 19–41)] and 19 female [25 years (18–35)] had a CFRD review as part of their annual screen. The remaining 17 (34%) were not screened: 1 (2%) pregnant, 7 (14%) DNA, 2 (4%) refused, 2 (4%) screened by GP, and 5 (10%) had died in the year before their annual review date
In those screened, mean HbA1C was 6% (range: males 5.8–10.2, females 5.4–11.2). Only 4 patients (12%) had a total serum cholesterol above the normal recommended range. 8 patients (24%) had mild to moderate lipodystrophy at their injection sites. 17 patients (52%) had already had an annual diabetic eye screen, of which the 7 results available were all normal. There was no evidence of peripheral neuropathy or microalbuminuria amongst the population.
Conclusion: Although screening for long term complications of diabetes is time consuming, carrying this out in patients with CFRD allows other aspects of their diabetes to be focused on. Upon review of these results, we have decided to continue with a modified CFRD long term complication screening programme in future years.

275 Audit of screening and diagnosis of Cystic Fibrosis related diabetes

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Cystic Fibrosis Related Diabetes (CFRD) has an increasing prevalence with age and is associated with increased morbidity. The UK Cystic Fibrosis Trust Diabetes Working Group recommendation of annual oral glucose tolerance tests (OGTT) on all cystic fibrosis (CF) patients over the age of 12 years (y) has huge resource implications. Therefore we tried a pragmatic approach of targeted OGTTs, and report our results.
Aim: To audit the current practice for screening and diagnosis of CFRD.
Method: We implemented a hospital standard of random blood glucose (RBG) measurements in all CF patients at annual review and action plan as follows.

RBG > 11.1 mmol/l	Repeat; if still high, treat with insulin
RBG 7.8–11.1 mmol/l	OGTT and home glucose monitoring (HGM) for 2 weeks
RBG < 7.8 mmol/l	Repeat in 1 year if no osmotic symptoms

We audited the adherence to the protocol over a 12 month period by retrospective review of case notes and laboratory data. We excluded known patients with CFRD.
Results: Annual RBG was checked in 195 of 271 (72%) CF patients during the audit period. 1 patient (11 y) – RBG > 11.1 mmol/l with symptoms – diagnosed as CFRD. 18 patients – RBGs between 7.8–11.1 mmol/l (age range 3–16 y, mean 8.5 y):
- 1 (10 y) had raised RBGs in hospital and diagnosed as CFRD
- 9 had normal OGTT and/or normal HGM
- 4 had normal repeat RBG
- 4 had no further investigations
- No other patient developed symptomatic CFRD during the audit period.

Conclusions: Annual OGTTs are difficult to implement and are likely to have a low yield of abnormalities. Annual RBG measurement may be useful to screen patients at risk for CFRD and OGTT can be used to confirm the diagnosis. Further research is needed to identify the RBG threshold at which OGTT should be performed, and the CF population to be screened.

276 Bone age in English children with CF using the RUS (TW2) method

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Introduction: Chronic respiratory infection and poor nutrition are thought to delay maturation and therefore bone age (BA). There has been a significant improvement in the morbidity and mortality of children with CF over the last 2 decades. We report the bone age of a large population of children with cystic fibrosis from the North of England and relate this to respiratory function and nutritional status.
Method: 71 children with CF aged 7–16 years underwent an X-ray of the left hand and wrist. BA was calculated using the RUS (TW2) method by a fellow in Paediatric Radiology fellow. She was blinded to the clinical condition of the patients. BA was expressed as a percentage of chronological age (%BA). Information on demographics, systemic steroid treatment, nutritional status, body composition parameters, infection status and respiratory function were prospectively collected.
Results: The mean and median %BA using TW2 was 102.3% and 102.5% respectively. There was no significant correlation between % BA and chronological age, BMI SD and FEV1 ($p=0.13$, 0.37, 0.92).
Conclusion: Delayed puberty has been considered to be normal in children with CF. In a recent study of pubertal status in contemporary Australian children with CF Buntain et al. reported a delay in BA (G&P method) in adolescents and a weak association with nutritional status was found. We report a study of BA using the more accurate RUS technique. No delay in BA and no significant association with nutritional status, lung function, and infection status were identified. The RUS (TW2) method of assessing skeletal maturity was developed in the 1960s and appears to relate to our current population of children with CF.